

REMARKS

Please reconsider this application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

Disposition of Claims

Claims 1-24 were pending in this application. Claims 2, 3, 14, 15, 17, and 18 are canceled by way of this reply. Claims 25-32 are added by way of this reply. Thus, claims 1, 4-13, 16, and 19-32 are pending in this application. Claims 1, 13, and 16 are independent. Claims 4-12, 23, and 24 depend directly from claim 1. Claims 19-22, 25, and 26 depend directly from claim 13. Claims 27-32 depend directly from claim 16.

Amendments to the Title

The title was amended to recite "Six-axis Sensor." No new matter has been added by way of this amendment.

Amendments to the Specification

Paragraph [0073] of the specification was amended to correct a minor labeling error in Equation 3. No new matter has been added by way of this amendment.

Allowable Subject Matter

Applicant thanks the Examiner for indicating that claims 12 and 18 contain allowable subject matter. By way of this reply, claim 16 has been amended to be in independent form and incorporate the allowable limitation from claim 18. Accordingly, Applicant believes that claim 16 and dependent claims 27-32 are placed in condition for allowance.

Amendments to the Claims

Independent claim 1 was amended to include the limitations of the previously presented claims 2 and 3. Accordingly, claims 2 and 3 have been canceled. Dependent claims 4-12 were amended to depend directly from claim 1.

Claim 13 was amended to be in independent form and include the limitations of the previously presented claims 1, 2, 13, and 14. Accordingly, claim 14 has been canceled. Dependent claims 19-22 were amended to depend directly from claim 13. New claims 25 and 26 were added to depend directly from claim 13. Support for these new claims may be found, for example, in previously presented claims 23 and 24.

Claim 16 was amended to be in independent form and include the limitations of the previously presented claims 1, 2, 13, 16, 17, and 18. Accordingly, claims 17 and 18 have been canceled. New claims 27-32 were added to depend directly from claim 16. Support for these new claims may be found, for example, in previously presented claims 19-24. Accordingly, no new matter has been added by way of these amendments.

Rejections Under 35 U.S.C. § 102

Claims 1, 2, 7-9, 13-15, 19, 20, 22, and 23 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent No. JP-2581820 ("Kabushiki"). To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

Independent claim 1 recites a 6-axis sensor for measuring both 6-axis forces and moments and 6-axis accelerations and angular accelerations. A 6-axis sensor according to claim 1 includes a plurality of strain gauges disposed on one plane and a plurality of first diaphragms. Further, claim 1 recites the limitation of the previously presented claim 3 that the "plurality of

first diaphragms are arranged around a central point of the plane at regular angular intervals and at the same distance from the central point.” Kabushiki is completely silent with respect to this limitation of claim 1. Thus, Kabushiki neither shows nor suggests all of the limitations of claim 1.

By way of this reply, claim 13 has been amended to be in independent form and include the limitations of the previously presented claims 1, 2, 13 and 14. Further, claim 13 recites “the operative bodies in contact with the plurality of first diaphragms at positions arranged around the central point of the plane at regular angular intervals and at the same distance from the central point,” which implicitly contains the same limitation of claim 3 discussed above with regards to claim 1. Thus, Kabushiki also neither shows nor suggests all of the limitations of claim 13.

Further, claim 13 recites that “the 6-axis sensor is configured to measure 6-axis accelerations and angular accelerations applied to the 6-axis sensor.” Kabushiki discloses “enabling three-dimensional detection of a contact force” (column 5, line 49), but is completely silent with respect to measuring angular accelerations. Thus, Kabushiki also fails to show or suggest this additional limitation of claim 13.

Because Kabushiki fails to show or suggest all of the limitations of independent claims 1 and 13, the claims are patentable over Kabushiki. Dependent claims are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Rejections Under 35 U.S.C. § 103

Claims 3-5 stand rejected under 35 U.S.C. § 103(a) as being obvious over Kabushiki in view of Japanese Patent Application No. 10-132668A ("Okada"). This rejection is respectfully traversed.

By way of this amendment, the limitation of the previously presented claim 3 is now included in independent claim 1. Specifically, independent claim 1 requires, in part, that the "first diaphragms are arranged around a central point of the plane at regular angular intervals and at the same distance from the central point." The Examiner asserts that Okada provides that which Kabushiki lacks with respect to this limitation. Specifically, the Examiner asserts that Okada teaches in Figure 9 that the first diaphragms are arranged around a central point at regular intervals as required by the claimed invention as recited in claim 1. However, Okada's Figure 9 illustrates a manufacturing step, not a final sensor.

In Figure 9, Okada teaches manufacturing multiple sensors from a single substrate, thereby showing a layout of 4 separate diaphragms on a single substrate. Okada teaches dividing these 4 diaphragms into 4 separate sensors at a later stage, with each sensor having the properties shown in Figures 1-3. See, Okada paragraph [0015]. In fact, Okada is completely silent with respect to multiple diaphragms arranged around a central point of the plane at regular angular intervals in order to form a single 6-axis sensor.

Because Okada fails to provide that which Kabushiki lacks with respect to claim 1, claim 1 is patentable over Kabushiki and Okada, whether considered separately or in combination. Dependent claims 4 and 5 are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 6 stands rejected over Kabushiki in view of Okada, in further view of U.S. Patent No. 4,094,192 ("Watson"). The Examiner asserts that Watson discloses evenly spaced intervals of 120 degrees, as required by claim 6 of the present invention.

Watson discloses evenly spaced strain gauges at intervals of 120 degrees, but is completely silent with respect to the strain gauges being attached to first diaphragms that are spaced at even intervals. Because Watson is also completely silent with respect to diaphragms being placed at evenly spaced intervals, Watson fails to provide that which both Kabushiki and Okada lack with respect to independent claim 1. Thus, claim 1 is patentable over Kabushiki, Okada, and Watson, whether considered separately or in combination. Dependent claim 6 is patentable over the cited references for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 10, 11, 16, and 17 stand rejected over Kabushiki in view of EP 1 284 055 ("Datex"). The Examiner asserts that Datex discloses a second member comprising a second diaphragm which comprises a plurality of strain gauges. As discussed above, claim 16 has been amended to be in independent form and include the allowable subject matter of claim 18. Further, claim 17 has been canceled by way of this reply. Thus, Applicant respectfully requests withdrawal of the rejection of claim 16 and notes that the rejection of claim 17 is moot.

With respect to dependent claims 10 and 11, Applicant asserts that Datex fails to provide that which Kabushiki lacks with respect to independent claim 1. Datex discloses a second member comprising a second diaphragm, but is completely silent with respect to the strain gauges being attached to first diaphragms spaced at even intervals. Thus, Datex fails to provide that which Kabushiki lacks with respect to independent claim 1 and claim 1 is patentable over Kabushiki and Datex, whether considered separately or in combination. Dependent claims

10 and 11 are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 21 stands rejected over Kabushiki in view of Watson. The Examiner asserts that Watson discloses evenly spaced intervals of 120 degrees, as required by claim 21. As discussed above, independent claim 13 is patentable over Kabushiki for at least the same reasons as claim 1. Further, Watson fails to provide that which Kabushiki lacks with regards to the limitation shared by claims 1 and 13. Thus, claim 13 is patentable over Kabushiki and Watson, whether considered separately or in combination. Dependent claim 21 is patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 24 stands rejected under 35 U.S.C. § 103(a) as being obvious over Kabushiki in view of Japanese Patent No. 2838361 ("Osaka-Fu"). The Examiner asserts that Osaka-Fu discloses that strain gauges are made of a thin film of chromium oxide formed on an insulating film. As discussed above, independent claim 13 is patentable over Kabushiki. Further, Osaka-Fu is completely silent with respect to the limitation of claim 13 that "operative bodies in contact with the plurality of first diaphragms at positions arranged around the central point of the plane at regular angular intervals and at the same distance from the central point." Thus, claim 13 is patentable over Kabushiki and Osaka-Fu, whether considered separately or in combination. Dependent claim 24 is patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

New Claims

By way of this reply, new claims 25-32 have been added to this application. As discussed above, no new matter has been added by way of these claims. Because claims 25-32

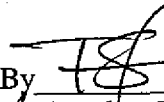
depend directly from independent claims 13 and 16, these claims are patentable for at least the same reasons set forth above with respect to claims 13 and 16. Accordingly, Applicant believes new claims 25-32 are in condition for allowance.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 07700/066001).

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Respectfully submitted,

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